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23413	7590	10/01/2007	EXAMINER	
CANTOR COLBURN, LLP			BARTON, JEFFREY THOMAS	
55 GRIFFIN ROAD SOUTH			ART UNIT	PAPER NUMBER
BLOOMFIELD, CT 06002			1753	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/707,981

Applicant(s)

KRELLNER ET AL.

Examiner

Jeffrey T. Barton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20040129, 20050411.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Comments

1. The Examiner suggests a change in claim wording in claims 4, 9, and 10. Currently these claims define the relative disposition of the support surface and non-support surface using the term "distance". It appears from the disclosure that the structure that Applicant is describing would be more accurately claimed if the term "distance" were replaced with "difference in elevation", or a similar term.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This claim only recites a hypothetical comparison between devices having structure (i.e. distances) that are not positively recited. It is entirely unclear what structural limitations Applicant is attempting to recite in this claim.
4. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no antecedent basis for "the first and second

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thermocouples” recited in lines 3-4 of the claim. It appears the claim was intended to depend from claim 14, and it is treated as such herein.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 13, 16, and 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakai et al. (JP 06-137935)

Regarding claims 13 and 20, Sakai et al disclose an apparatus for infrared detection (Figure 1) comprising an infrared radiation sensor element (Layers 20-50 and associated contacts) which comprises an infrared radiation receptor (50) disposed at a hot region (Over the central opening in substrate 10), first and second terminals (32, illustrated at either side of the sensor in Figure 1) disposed at a cold region (Peripheral area contacting substrate 10); each terminal being in signal communication with the receptor (Paragraph 0024); a base header (60) having a support surface (Directly beneath cement 62) as claimed and a non-support surface (Upper surface of crevice 68) displaced from the support surface; wherein heat transfer between the cold region

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and the support surface will comprise conduction (i.e. Solid materials provide contact, each solid having finite thermal conductivity); wherein heat transfer between the hot region and non-support surface will comprise convection (i.e. gas lies between these structures; Paragraphs 0019-0021); and wherein a portion of the infrared radiation sensor element at the cold region (i.e. that contacting substrate 10) opposes a portion of the support surface and a portion of the element at the hot region (i.e. over the central opening in substrate 10) opposes a portion of the non-support surface (Figure 1)

Regarding claim 16, Sakai discloses the non-support surface being displaced from the support surface by 1.5 mm. (Paragraph 0030; depth of crevice 68 corresponds to the claimed displacement)

Regarding claim 18, Sakai discloses the apparatus comprising a cap (Figure 1; lid 70) such that the sensor is disposed between the cap and base header (60), the cap and base header defining an internal volume (Figure 1), and the cap having a window 72) proximate the hot region as claimed. (Paragraph 0027)

Regarding claim 19, Sakai discloses a gas within the internal volume as claimed. (Paragraphs 0023 and 0027-0031)

7. Claims 1-4, 6, 8, 11-15, and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Lambert et al. (US 6,828,560)

Regarding claims 1 and 20, Lambert et al disclose a thermal detection device (Figures 1 and 5; Column 4, line 28 - Column 5, line 4) comprising first and second thermocouples having defined polarities as claimed disposed across hot and cold

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regions (Figure 1; thermocouples 18; Column 4, lines 36-38; series connection on opposing sides of the hot region is apparently is what is contemplated by the "polarity" limitations; note Paragraph 0016 of the instant specification); first and second terminals (36 and 38) disposed at a cold region, being in signal communication with receptor 14 via thermocouples 18; a thermal absorber 14 in thermal communication with the thermocouples; a base header 52 having a support surface (56) that supports the sensor element and a non-support surface (60) displaced from the support surface, wherein a portion of the support surface (i.e. under frame body 20) opposes a portion of the cold region and a portion of the non-support surface (i.e. under absorber 14) opposes a portion of the hot region.

Regarding claim 13, in addition to the disclosure cited above in addressing claim 1, heat transfer between the cold region and the support surface in the apparatus of Lambert et al will comprise conduction, since the materials (i.e. membrane 16, solder bumps 70 and 72) lying between these structures have finite thermal conductivity. In addition, heat transfer between the hot region and non-support surface will comprise convection, because in operation, absorber 14 will reach a higher temperature than surface 60, and the way in which the structure is manufactured will leave gas within the rectangular void. (Column 4, lines 38-39)

Regarding claims 2 and 15, the apparatus of Lambert et al comprises a diaphragm (16) disposed between the support surface and the first and second thermocouples. (Figures 1 and 5) A portion of this membrane (i.e. the central portion) opposes the non-support surface 60.

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Regarding claim 3, the thermocouples of Lambert et al are responsive to thermal radiation absorbed by the absorber as claimed. (Column 4, lines 62-66; Column 3, lines 7-12)

Regarding claim 4, this claim does not further structurally limit claim 3, and the claim is therefore rejected on the same grounds as claim 3. The structure required by the claim is not distinct from that described by Lambert et al.

Regarding claim 6, the non-support surface of Lambert et al is the bottom of a cavity formed in the support surface. (Figure 5)

Regarding claim 8, either solder bump 70 or 72 on support surface 56 reads on a "spacer".

Regarding claims 11 and 18, the apparatus of Lambert et al comprises a cap (54) disposed to house the thermocouples 18 between the cap and base header, the cap and base header defining an internal volume (Figure 5), and the cap having a window (central portion) proximate the hot region for transmitting thermal radiation. (Column 4, lines 28-61)

Regarding claims 12 and 19, the apparatus of Lambert et al includes a gas within the internal volume that is in fluid communication with the non-support surface. (Column 4, lines 28-39; manufacture as disclosed will result in gas being present in the rectangular void)

Regarding claim 14, the sensor of Lambert includes thermocouples as claimed (See comments regarding claim 1 above), and first and second terminals 36 and 38 are

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in signal communication with respective first and second thermocouples (Figure 1). The sensor's response to thermal radiation is as claimed. (Column 3, lines 7-14)

8. Claims 1-9, 11-16, and 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Wilner et al. (US 2002/0139410)

Regarding claims 1 and 20, Wilner et al teach a thermal detection device (Figures 1A-1D) comprising first and second thermocouples disposed across hot and cold regions as claimed (Figure 1B, thermocouples 24; Paragraph 0024; series connection on opposing sides of the hot region is apparently is what is contemplated by the "polarity" limitations; note Paragraph 0016 of the instant specification) first and second terminals (Leads 22, Figure 1B) disposed at a cold region, being in signal communication with receptor 25 via thermocouples 24; a thermal absorber 25 in thermal communication with the thermocouples; a base header 12 having a support surface (At the edges) that supports the sensor element and a non-support surface (Narrower central region) displaced from the support surface, wherein a portion of the support surface (i.e. leftmost surfaces in Figure 1A) opposes a portion of the cold region and a portion of the non-support surface (i.e. left surface of region 13 in Figure 1A) opposes a portion of the hot region.

Regarding claim 13, in addition to the disclosure cited above in addressing claim 1, heat transfer between the cold region and the support surface in the apparatus of Wilner et al will comprise conduction, since the support surface directly contacts the cold region that is the outer portion of film 132 (Figure 2). In addition, heat transfer

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between the hot region and non-support surface will comprise convection, because in operation, absorber 25 will reach a higher temperature than region 36, and the way in which the structure is manufactured will provide gas within the defined volume.

(Paragraph 0027)

Regarding claims 2 and 15, the apparatus of Wilner et al comprises a diaphragm (Figure 2; layer 132 that supports thermocouples 24) disposed between the support surface and the first and second thermocouples. A portion of this membrane (i.e. the central portion) opposes the non-support surface of region 13.

Regarding claim 3, the thermocouples of Wilner et al are responsive to thermal radiation absorbed by the absorber as claimed. (Paragraphs 0024-0025; Paragraph 0036)

Regarding claim 4, this claim does not further structurally limit claim 3, and the claim is therefore rejected on the same grounds as claim 3. The structure required by the claim is not distinct from that described by Wilner et al.

Regarding claim 5, Wilner et al disclose the absorber 25 being a black body. (Paragraph 0024)

Regarding claim 6, the non-support surface of Wilner et al is the bottom of a cavity formed in the support surface. (Figure 1A)

Regarding claim 7, any slot 32 along the edges of the cavity reads on a "side channel". (Paragraph 0026)

Regarding claim 8, gold-tin alloy 272 positioned between chips 12 and 14 reads on a spacer. (Paragraph 0034)

Regarding claims 9 and 16, Wilner et al disclose the sensor chip being about 1 mm thick. With the proportions shown in Figure 1A, the non-support surface will be displaced from the support surface by a distance within the claimed range for a 1 mm thick device.

Regarding claims 11 and 18, the apparatus of Wilner et al comprises a cap (14) disposed to house the thermocouples 24 between the cap and base header, the cap and base header defining an internal volume (Figure 1A), and the cap having a window (36) proximate the hot region for transmitting thermal radiation. (Paragraph 0036)

Regarding claims 12 and 19, the apparatus of Wilner et al includes a gas within the internal volume that is in fluid communication with the non-support surface. (Paragraph 0027)

Regarding claim 14, the sensor of Wilner et al includes thermocouples as claimed (See comments regarding claim 1 above), and first and second terminals 22 (Figure 1B are in signal communication with respective first and second thermocouples. The sensor's response to thermal radiation is as claimed. (Paragraph 0036)

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambert et al in view of Watanabe et al.

Lambert et al disclose an apparatus as described above in addressing claims 1-4, 6, 8, 11-15, and 18-20. They also disclose that absorber 14 is prepared in a conventional manner. (Column 3, lines 3-4)

Lambert et al do not explicitly disclose the thermal absorber being a black body.

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Watanabe et al teach that black body absorbers for thermopile-type infrared sensors are conventional in the art. (Column 1, lines 40-61)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Lambert et al by specifically using a black body as the absorber, as taught by Watanabe et al, because the utility of black bodies as infrared absorbers in thermopile infrared sensors was conventional in the art, as evidenced by the teaching of Watanabe et al. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

13. Claims 9, 10, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambert et al.

Lambert et al teach an apparatus as described above in addressing claims 1-4, 6, 8, 11-15, and 18-20.

Lambert et al do not teach a specific depth of the void in circuit board 52.

However, given conventional dimensions of circuit boards in the art (i.e. on the order of a few millimeters thick), it would have been obvious to one having ordinary skill in the art to select any convenient depth, depending upon the degree of thermal insulation required (Note Column 4, lines 33-36) and the strength/ruggedness of the board that results from void formation. Such a depth could clearly be about 1 mm. Additionally, in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir.

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1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

14. Claims 10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilner et al.

Wilner et al disclose an apparatus as described above in addressing claims 1-9, 11-16, and 18-20.

Wilner et al do not explicitly disclose the non-support surface being displaced from the support surface by about 1 mm.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Wilner et al to have any appropriate thickness, and thus any corresponding displacement between the support and non-support surfaces within the sensor design of Figure 1, depending on the size requirements of a given application. Note that in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. There

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is no reason to believe that the basic function of such sensors will change with varying dimensions.

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al.

Sakai et al disclose an apparatus as described above in addressing claims 13, 16, and 18-20.

Sakai et al do not explicitly disclose the non-support surface being displaced from the support surface by about 1 mm.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Sakai et al to have any appropriate thickness, and thus any corresponding displacement between the support and non-support surfaces within the sensor design of Figure 1, depending on the size requirements of a given application. Note that in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. There is no reason to believe that the basic function of such sensors will change with varying dimensions.

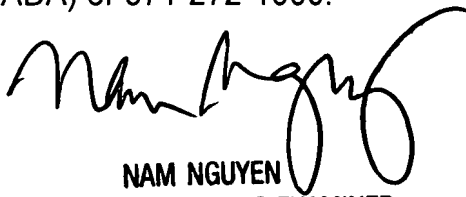
Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
18 September 2007


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